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**INTEGRATING SERVQUAL AND QFD FRAMEWORK FOR PRODUCT AND
SERVICE DESIGN CASE STUDY: BEEHIVE CAFÉ BANDUNG**

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Abstract. Recently, the growth of café and restaurant industry was increased in Indonesia. Thus, every café and restaurant offer unique concept and innovative product and service to customer. This condition would create the competition that higher than before, and it likely could make possibility to loss the market. Therefore, in competing with the competitors, a café should consider the appropriate design of product and service to fulfill customer expectation. Customer expectation could influence the revenue of café and restaurant, so the quality of product and service that suitable with the expectation can keep the current market and capture potential market. By deploying questionnaire to 105 respondents that consists of current customer and potential customer of Beehive café, this research could define specification to describes the VOC. Additionally, this questionnaire applied the principal of SERVQUAL's dimensions namely tangible, reliable, responsible, assurance and empathy. After the VOC defined, this research conducted QFD framework from defining voice of customer (VOC) until technical evaluation. Moreover, this research contributed in two points: (i) propose appropriate design for product and service in Beehive café in order to meet customer needs and desires, (ii) provide the priorities of project improvement should be taken by Beehive café to fulfill customer expectation and to compete with other competitors. The fundamental result of this research is Beehive café has 12 factors of VOC that should be completed by 29 specifications of technical characteristics. Besides that, if compared with other competitors Beehive café still did not serve product and service suitable with customer expectation. However, in technically Beehive café had good specification of technical characteristics to answer VOC, but in practically Beehive could not optimize these specifications to fulfilled expectation of customer. On the other word, this research can help Beehive café to determine what will satisfy the customer and where to deploy the effort in urgent improvement.

Keywords: Quality Function Deployment, SERVQUAL, Voice of Customer, and Customer Expectation

Introduction

The restaurant industry is a demanding sector that stresses the provision of high-level customer service and continuous quality improvement. As lifestyles change and dining out becomes more and more commonplace, customers desire new flavors, comfortable ambience and pleasant memories (Markovic, Raspor, Segaric, 2010). Beehive café is one of new restaurants/café that located on Dayang Sumbi No 1 Bandung. This location is strategic because there are some universities surrounding Beehive area such as ITB, UNPAD, ITHB, and UNIKOM. In addition, this location is the one of locations that considered as the central of culinary because many café and restaurants in this location so it shows competition that more intense between the competitors. In other word, Beehive café should make the strategies to capture the market because the potential customer will be more sophisticated to choose the restaurant or café.

Quality of product and service are important to enhance ability of company in order to satisfy the customer. Besides that, competition of the business is also essential because it can be a threat to company itself so each business should know strengthens and weaknesses in the business itself.

Based on geographical aspect, Beehive cafe is locating surrounded by other similar cafe and restaurant that probably would create high competition in culinary market. It means Beehive café should maintain its performance to keep the market, especially with the high level of competition.

In addition, the main problem is Beehive café has unstable revenue that could influence the existence of Beehive café. Beehive did not always achieve the beyond revenue, it means Beehive café got revenues below the target in the certain time. Those conditions caused by loss the potential customer and existing customer in the market. Hence, customer is one of important stakeholder in the business because they are people who will use the product and service that offered by Beehive café. Thus, nowadays customer has higher expectation to product and service than in the previous time. It means the quality and conformance of product and service is important to fulfill the customer expectation. Beehive café should meet customer requirement and serve the product and service according to its requirement to create customer satisfaction.

Literature Review

Product and Service Design toward Customer Satisfaction

In the business of food such as café and restaurants, needs and desire of customer are very essential. Maslow (1943) mentioned the hierarchy of needs, which is focus on the physiological needs, safety needs, belongingness needs (social needs), esteem needs, and self-actualization. Maslow believed that within these human needs, food is the most basic of them all. Thus, physiological needs are the most dominant of all the other needs, so the player of café and restaurant business should consider many points to satisfy their customer. Moreover, design of product and service in the business has a connection toward customer satisfaction because appropriate design can drive a product and service to fulfill the customer expectation. Customers deserve the product and service which have good quality to achieve their expectation

A. SERVQUAL

Parasuraman et al., (1985), developed a model of service quality after carrying out a study on four service settings: retail banking, credit card services, repair and maintenance of electrical appliances, and long-distance telephone services. The SERVQUAL model represents service quality as the discrepancy between a customer's expectations of service offering and the customer's perceptions of the service received Parasuraman et al., (1985). SERVQUAL model represented by five dimensions, the dimensions are tangible, responsiveness, reliability, assurance, and empathy.

Table 1. SERVQUAL's Dimension

Dimension	Factor	Source
Tangible	<ul style="list-style-type: none"> - Availability of facilities - Cleanliness and neatness of employee - Parking area - Building facility and dining area - Comfort and cleanness 	(Arinta Dea, Wike, Dania, Synthia, 2012), (Suzana, Sanja Raspor, Klaudio Segaric, 2010) (Wang, Wen Sheng, 2012)
	<ul style="list-style-type: none"> - Location - Lighting, air ventilation - Marketing kit - Variation of menu - Professional staff - Uniqueness 	(Wang, Wen Sheng, 2012), (Ching-Hsu Huang, 2012),
	<ul style="list-style-type: none"> - Ambience, atmosphere, and spaciousness 	(Firdaus, Zainoren, Abdurahman, Hamali, 2011),

	<ul style="list-style-type: none"> - Comfortable dining environment - Presentation and hygiene of staffs - Ease transportation and parking 	(Hsing Chen, 2012), (Wen Sheng, 2012)
Reliable	<ul style="list-style-type: none"> - Accuracy of order - Accuracy of bill - Accuracy of serving during first attempt - Providing quick and accurate service - Notifying waiting time - Price 	(Firdaus Abdullah, Zainoren, Abdurahman, Jamil, 2011), (Hsing-shen, 2012), (Hsu-huang, 2012), (Wang, Wen Sheng, 2012)
Responsible	<ul style="list-style-type: none"> - Immediate rectification of mistakes - Immediate response - Helpful staff and polite - Provide information - Serving appropriate product and service 	(Arinta Puspita ¹ , Wike, Dania, Shyntia Atica ² , 2012), (Suzana, Sanja Raspor, Segaric, 2010), (Wang, Wen Sheng, 2012), (Hsu Huang, 2012)
Assurance	<ul style="list-style-type: none"> - Quality of food - Safe food source - Halal brands, trademarks, logos - Security - Hygiene food and safety 	(Wang, Wen sheng, 2012), (Suzana, Sanaja raspor, Segaric, 2012), (Firdaus, Zaioner, Abdurahman, Hamali, 2011)
Empathy	<ul style="list-style-type: none"> - Politeness of staff - Friendly staff - individual attention - Attitude and courtesy - Staff can understand customer needs - Staff can create good ambience to customer 	(Hun-Hsing Chen, 2012), (Firdaus, Abdullah, Jamil, 2011), (Hsing-Shen, 2012), (Suzana, Sanja Raspor, Segaric, 2012).

B. Quality Function Deployment

Quality function deployment (QFD) is a technique from Japan as a strategy assuring that quality built into new products. Refers to theory from Lynch and Cross, QFD is a system for designing a product or a service based on customer wants (voice of customer), involving all members of the supplying organization. Based on Heizer and Render (*Operation Management; 2011*), QFD is determining what will satisfy the customer and translating those customer desires into the target design. QFD aim to transform customer requirements into engineering characteristics, parts characteristics, key process operations, and production requirements sequentially

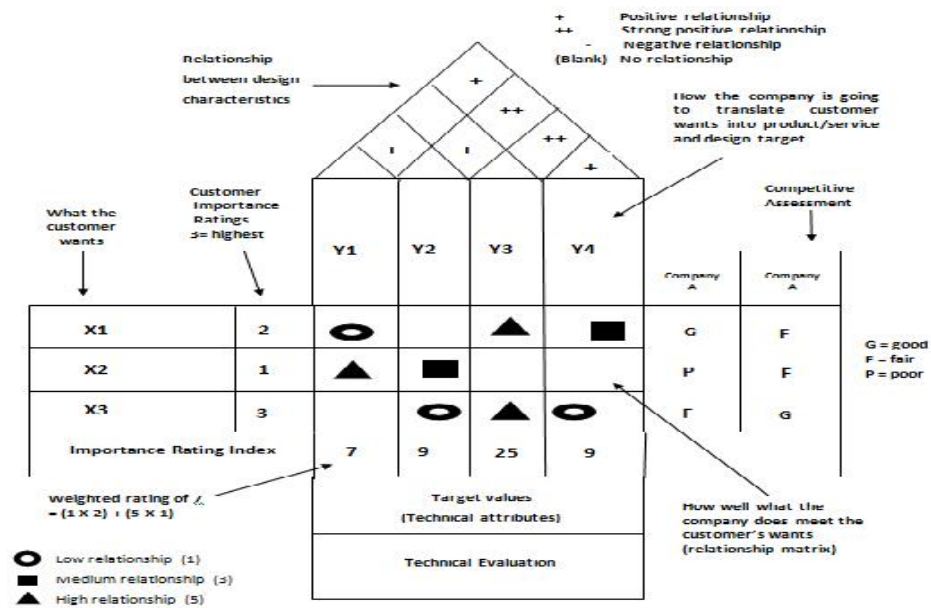


Figure 1. Quality Function Deployment

Methodology

This research used primary data that conducted through questionnaires for quantitative data and depth-interview for qualitative data. The respondents are Bandung people who aged between 18 until 30 years old and they usually to spend the money to dining out in café or restaurant. Sample size determined from Burns et al (2010), so this study took 105 respondents to gather the customer preferences on choosing café and restaurant in Bandung. The questionnaire applies SERQUAL framework and referred to Likert Scale method by numbered in 1-5 (1: Extremely not important, 2: not important, 3: important, 4: very important, 5: very extremely important) based on importance level of attributes.

Statistical analysis also used in this study to make sure the reliability and validity the data. This study conducted validity and reliability through item to correlation, alpha cronbach and factor analysis. In addition, one-tailed t test also used to determine the P-value to assess hypothesis in the data. The respondent profile can be seen in table 2, and the result of statistical analysis in table 3.

Table 1. Respondent Profile

Items	%	Items	%
Gender		Most preferable place to dining out	
Male	34.28%	Warung nasi	39.04%
Female	65.72%	Canteen	72.38%
Age		Rmh Makan	55.23%
< 18	2.9%	Restaurant	55.38%
18 – 25	95.2%	Café	60.90%
25 – 30	1.9%	Other	1.9%
< 30	0		

Occupation		Most preferable type of resto/café	
Student	2%	Indonesian	76.2%
College Student.	94%	Western	74.3%
Official	4%	Japanese	53.3%
Employee	0	Chinese	20%
Housewife	0	India	3.9%
Other		Other	0
		Expense for meal in dining out	
		< 40.000	14.3%
		40.000 – 80.000	60%
		80.000 – 150.000	23.8%
		> 150.000	1.9%

Table 2. The results of statistical analysis

Dimension	Factor	Mean	Standard Deviation	Item to Correlation > 0.3	Cronbach Alpha > 0.7	Factor Analysis > 0.5
TANGIBLE	T1	3.83	0.68	0.413	0.704	0.56
	T2	4.54	0.52	0.594		
	T3	4.25	0.79	0.397		
	T4	4.3	0.55	0.647		
RELIABILITY	R1	4.64	0.418	0.673	0.789	0.836
	R2	4.58	0.552	0.673		
RESPONSIVENESS	RS1	4.5	0.565	0.61	0.756	0.805
	RS2	4.42	0.614	0.61		
ASSURANCE	A1	4.43	0.614	0.709	0.832	0.752
	A2	4.45	0.498	0.684		
	A3	4.44	0.574	0.697		
EMPATHY	E1	4.427	0.62	0.641	0.781	0.82
	E2	4.399	0.64	0.641		

Results

This study applies fishbone diagram to observe the causes-effects of less revenue in beehive café. There are four branches in fishbone diagram that will explains the issues are relating with the less revenues in Beehive café. The branches are consisting of manpower or employee issue, food and taste issue, competitor issue, and customer issue. According to depth-interview with management of Beehive café especially Mr. Rudi, each issue has points that connected mutually to influence the performance of Beehive café. The specific diagram of fishbone can be seen in figure 2.

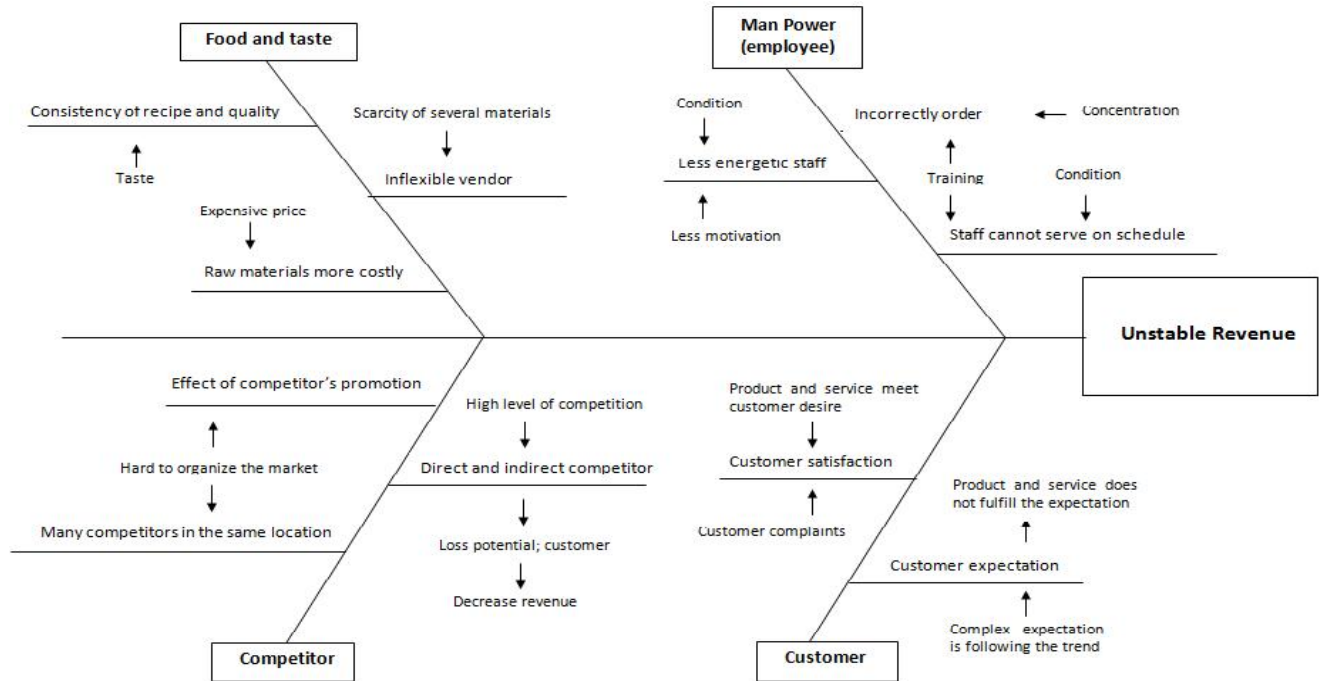


Figure 2. Quality Function Deployment

Eventually, fishbone diagram in figure 2 showed that competitor issue can connect the other issues because according to problem identification in chapter 1, competitor issue that increased level of competition in Beehive location indicates food and taste, manpower, and customer are important issue that must be able fulfilled by Beehive café to covering the high level of competition. Quality of food and taste, performance improvement of staff, accomplish customer expectation to satisfying customer are the methods that can be considered to handle competitor issue in order to improve the less revenue in the future time.

A. Quality Function Deployment

To apply QFD method, the author was conducted two surveys in the process. One survey was designed for customer of café, while other survey for expert, which is Mr. Rudi Nasihin as manager of Beehive café Bandung.

A.1. Voice of Customer

First phase of QFD is defining customer requirement that represented VOC. Voice of customer describes customer desire that must be fulfilled by Beehive café to satisfying its customers. After the data from questionnaire passed statistical process, the data can be considered into customer requirement. Voice of customer (VOC) can be seen in table 4.

Table 3. Voice of Customer

Dimension	Factor Attributes
Tangible	T1: Availability and cleanness of facility T2: Availability and cleanness of supporting facility T3: Appearance of employee T4: Aesthetics, Layout design, Location
Reliability	R1: Conformity of product and service that offered to

	customer R2: Accurate and consistency
Responsibility	RS1: Staffs are willing to help or respond customer and providing prompt service to customer RS2: Staffs have knowledge to provide information and answer customers' questions
Assurance	A1: Security A2: Warranty of product and service A3: Attitude of staffs
Empathy	E1: Employee initiative in providing services perfectly to customer E2: Communication and courtesy

A.2. Technical characteristics

Technical characteristics were obtained from depth-interview and discussion with manager of Beehive café Mr. Rudi Nasihin. Technical characteristics or voice of design must be able to answer voice of customer in order to fulfill customer expectation and satisfying customer.

Table 4. Technical Characteristic

Cleanliness schedule	S1	Number of waitress	S16
Have at least 3 toilets for each gender	S2	Computerize cashier	S17
Medium room for musola	S3	Comment card	S18
Parking lot for 20 cars and 30 motorcycle	S4	Information centre/receptionist	S19
Uniform	S5	CCTV for each room	S20
Good looking	S6	2 security guards	S21
Table size	S7	Parking officer	S22
Lighting	S8	Certification (Halal/ Food grade)	S23
Air ventilation	S9	Reversion cost	S24
Accessible location	S10	Quality control	S25
Decoration	S11	Humble and friendly staff	S26
Medium price level	S12	Reception greeting	S27
Standardize recipe	S13	Dual language	S28
Adaptation of taste	S14	Gesture	S29
Number of chefs	S15		

A.3. Correlations of Technical Characteristics

The next step is defining correlation of technical characteristic or technical requirements (HOWs). Correlation of technical characteristic was developed to determine connection among parameters in technical characteristics. Degree of correlation will be illustrated with several symbols; those symbols will describe level of correlation (strong positive, positive and negative relationship).

Statement	Symbol
Strong positive	●
Positive	○
Negative	—

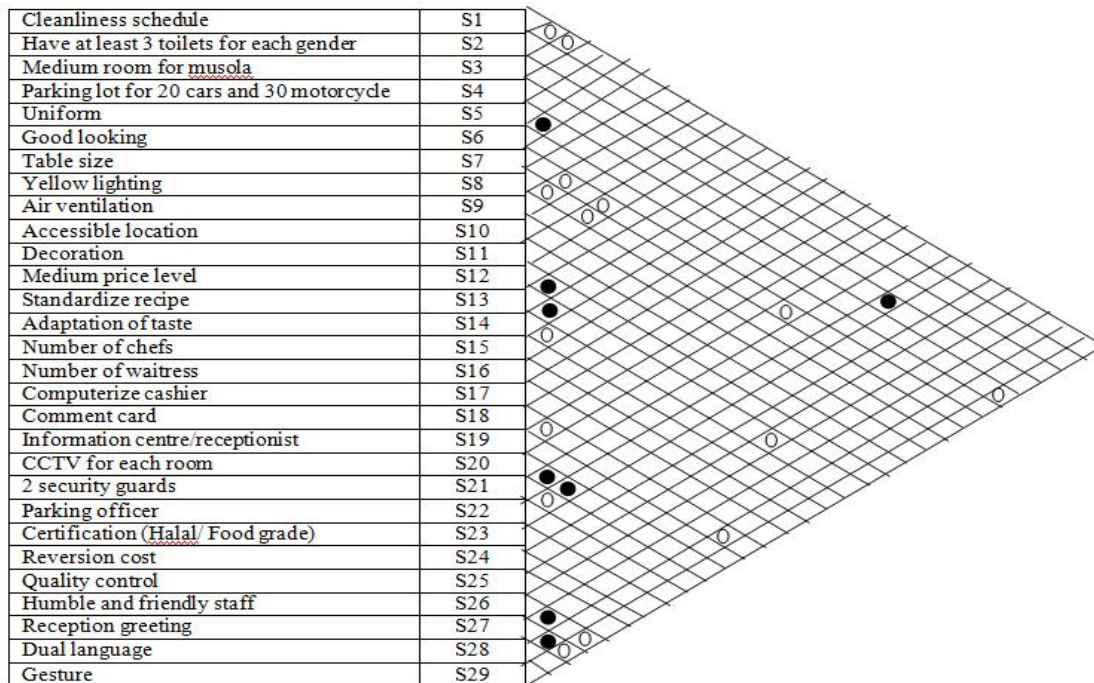


Figure 3. Correlation of technical characteristic

A.4. Relationship of Matrix (WHATs and HOWs)

The next step is investigating relationship between customer requirements (WHATs) and technical characteristics (HOWs) in order to identify important product attributes. The relationship conducted to rating on scale consisting of 1, 5, and 9, where 1 means weak relationship, 5 for somewhat relationship, and 9 indicates strong relationship between WHATs and HOWs.

Statement	Symbol	Value
Strong relationship	●	9
Somewhat relationship	○	5
Weak relationship	△	1

Customer Requirement	Important Rating	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29
T2	3	●	●	●	●																○									
T3	1					●	●																							△
T4	2	○	△	△	△			●	●	●	●	●																		
R1	4											●	●	●	△															
R2	3											○	○	○	○	○	○	●												
RS1	3																△		●	○									△	
RS2	2																			●									○	△
A1	2																				●	●	●							
A2	3																					○	●	●						
A3	2					△																					●	△		●
E1	3																									△	○		○	
E2	2																										●	●	●	○

Importance	Rating
37	
29	
29	
29	
11	
9	
18	
9	
9	
9	
51	
51	
51	
19	
18	
27	
27	
33	
18	
18	
18	
15	
27	
27	
39	
35	
31	
46	

Figure 4. The result of correlation matrix

Relationship of matrix also consisting of importance rating index or important weighted. Importance rating index obtained by accumulation from value of each relationship multiplied with importance rating of each VOC. Refers to calculation of importance rating index in figure 8, the highest score is 51 and lowest score is 9. Furthermore, "medium price level", "adaptation of taste", "standardizes recipe", "humble and friendly staff", "reception greeting", "cleanliness schedule", and "gesture of staff" are the highest contributors to overall improvement in order to fulfill customer expectation and achieve customer satisfaction.

A.5. Competitive Assessment

Competitive assessment is one of stages in quality function deployment that aims to assessing competing product and comparing with other competitors. In this research, the author would compare Beehive café with X café and Y café that are direct competitors to Beehive café because these café operated in nearby location and offered somewhat similar concept and product to customer.

This assessment conducted by discussing with manager of Beehive café, observation directly, and short interview with some customers from X café and Y café. In addition, competitive assessment can compare whether these café meet customer requirements and satisfying customer expectation or not, therefore the result of competitive assessment can shows ability to translate voice of customer into product and service.

[illegible]

Figure 5. Result of competitive assessment

Based on calculation of competitive assessment, Beehive café excellent in appearance of employee, accurate and consistency, staffs are willing to help customer and providing prompt service to customer, security, warranty of product and service, and communication and courtesy of employee. In addition, cafe X excellent in availability and cleanness of supporting facility, appearance of employee, accurate and consistency, security, and attitude of staffs. Besides that, café Y also excellent in availability and cleanness of supporting facilities, conformity of product, and service,

accurate and consistency, staffs have knowledge to provide information and answer customer's question, and employee initiatives in providing service perfectly to customer.

Hence, in total score of competitive assessment shows Beehive café got second place because Y café have highest score than Beehive café itself. Beehive café has 117 of the score, X café has 116 of the score, and Y café has the highest score, which is 119. Beehive score indicates that Beehive must be able more pay attention against customer requirements. In other word, Beehive café requires to improving its performance in critical aspects on translating customer requirements into its product and service.

A.6. Technical Evaluation

The phase of technical evaluation aims to evaluate current technical and compare technical performance of Beehive café with other competitors to identify desirable technical attributes that could answer customer requirement in this case. Technical evaluation process and calculation can determine bad and good performance in each technical for Beehive café and its competitors.

B	Technical Evaluation					Target Value	nce Weighte	Technical Requirem
	1	2	3	4	5			
185					B X Y	Maintain current level	37	S1
145					B X Y	Maintain current level	29	S2
145				X Y	B	Maintain current level	29	S3
145				Y	B X	Maintain current level	29	S4
33			B		X Y	Develop uniform of staff	11	S5
27			B X	Y		Upgrade level	9	S6
90				Y	B X	Maintain current level	18	S7
45				Y	B X	Maintain current level	9	S8
45				Y	B X	Maintain current level	9	S9
45					B X Y	Maintain current level	9	S10
18		B X Y	Y			Upgrade level	9	S11
153		X Y	B			Maintain current level	51	S12
204				B X Y		Upgrade level	51	S13
255			X	Y	B	Maintain current level	51	S14
95				X	B Y	Maintain current level	19	S15
90				X	B Y	Maintain current level	18	S16
135				Y	B X	Maintain current level	27	S17
54		B	X	Y		Upgrade level Develop information centre/	27	S18
66		B	Y		X		33	S19
90				X Y	B	Maintain current level	18	S20
54			B X	Y		Upgrade level	18	S21
54			B	X Y		Upgrade level	18	S22
45			B	X	Y	Develop certification	15	S23
135				X	B Y	Maintain current level	27	S24
135				Y	B X	Maintain current level	27	S25
195				X Y	B	Maintain current level	39	S26
105			B	X Y		Upgrade level	35	S27
31	B X Y					Upgrade level	31	S28
230					B X Y	Maintain current level	46	S29
304								

	X	185	145	116	145	55		27	90	45	45	45	18	102	204	153	76	72	135	81	165	72	72	54	72	60	108	135	156	140	31	230	296
	Y	185	145	116	145	55		36	72	36	36	45	27	102	204	204	95	90	108	108	99	72	72	72	72	75	135	108	156	140	31	230	297

Figure 6. Result of technical evaluation

Beehive café is good at cleanliness schedule, providing toilets room, musola room, parking area, table size, lighting, air ventilation, accessible location, medium price level, number of chefs and waiters, computerize cashier, providing CCTV, reversion cost system, quality control, humble and friendly of staff, and gesture. Therefore, those points should be maintained but Beehive should also keep on monitoring the competitor's progression.

Moreover, Beehive café has also some points of technical characteristics that must be upgraded into higher level in order to compete with its competitors. Those points are good-looking staff, decoration, standardize recipe, customer feedback/ comment card, security guards, parking officer, reception greeting, and dual language. Thus, there are three points that must be developed to get optimal performance. First point is developing uniform of staff because Beehive has still the lowest score in this point, Beehive should improve the uniform to show its identity and to strengthen its concept. Second point is information centre or receptionist.

Furthermore, the accumulation of technical evaluation showed that Beehive café got first place. Even though in competitive assessment, Y café got first place because this café was established earlier than Beehive café. It also make assumption that Y café more renowned than Beehive café. Therefore, even Y café got lower place than Beehive café in technical evaluation, practically Y café can keep on leading in translating voice of customer into its product and service. Eventually, Beehive should consider the points of technical characteristics that have differentiate in level of improvement. In contrast, these technical characteristics must be able to answer voice of customer.

Conclusions and Recommendation

Based on foregoing explanation, this study showed that assessment of SERVQUAL framework and QFD method can be applied to improve Beehive performance. Therefore, some recommendations can be described on the below:

- In high level of competition, Beehive café should make evaluation periodically of performance that will assess the progress point and the retreat point to improve the performance, and increasing product and service design to answer customer requirements.
- Through SERVQUAL framework in questionnaire survey, this study summarizes customer requirements in each dimension. According to the results, Beehive café should emphasize importance points of SERVQUAL dimension that can contribute to fulfill customer expectation and customer satisfaction
- According to QFD results, Beehive should consider the promotion and product sounding to customer because in competitive assessment recorded that Beehive did not achieve highest score while beehive café had good technical characteristic in its business. It assumes that there are two assumptions in Beehive case; firstly, Beehive cannot soundings its excellent specification of technical characteristics in answering customer requirements. Secondly, Beehive cannot optimize technical characteristics of Beehive in practically, so mostly the customers did not realize that Beehive is excellent in answering voice of customer into design of product and service that offered to customer. Therefore, Beehive should promote or sounding product to customer and Beehive should optimize performance in practically in term of the technical specification.

- The following result of target value part, Beehive divided level of improvement into 3 levels, which are maintain current level, upgrade level, and develop specification. Beehive should maintain the current level when Beehive has maximum score, or while Beehive café has fair score but other competitors have lower score so Beehive should keep on maintaining the current level in order to reduce cost and effort. However, Beehive should be able to pay attention on competitor progression.
- Beehive should upgrade the level when Beehive has fair score with insignificant range between score of competitors. Beehive should upgrade the level in step by step, it means Beehive should just one step ahead towards the competitors.
- In addition, Beehive should develop specification when Beehive has poor score and other competitors have higher score with significant range toward Beehive, or while the competitors have maximum score but Beehive has only fair or poor score.

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